

CLAIMS

What is claimed is:

1. A method comprising:

operating a storage system which includes a plurality of mass storage devices and a first storage server head to access the mass storage devices in response to client requests, wherein the first storage server head has ownership of the plurality of mass storage devices; and

reassigning ownership of at least one of the mass storage devices to a second storage server head, independently of a manner in which the second storage server head is connected to the plurality of mass storage devices.


2. A method as recited in claim 1, wherein the first storage server head and the plurality of mass storage devices are mounted in a single chassis prior to said reassigning ownership.

3. A method as recited in claim 2, further comprising operating the second storage server head to access the mass storage devices in response to client requests, while the second storage server head is external to the chassis.

4. A method as recited in claim 3, further comprising removing the first storage server head from the chassis prior to operating the second storage server head to access the mass storage devices.

5. A method as recited in claim 1, wherein reassigning ownership of at least one of the mass storage devices comprises using a software-based command to reassign ownership of said at least one of the mass storage devices.

6. A method as recited in claim 5, wherein using a software-based command to reassign ownership of the plurality of mass storage devices comprises storing an ownership attribute on a storage medium in each of said at least one of the mass storage devices.

7. A method of reconfiguring a storage system, the method comprising: 
operating an integrated storage system which includes a plurality of mass storage devices installed in a chassis and a storage server head installed in the chassis to access the mass storage devices in response to client requests, wherein the storage server head has ownership of the plurality of mass storage devices;
disconnecting the storage server head from the mass storage devices;
removing the storage server head from the chassis;
connecting an external storage server head unit to the mass storage devices installed in the chassis; and
using a command to reassign ownership of the plurality of mass storage devices from the storage server head to the external storage server head unit.

8. A method as recited in claim 7, wherein using a command to reassign ownership of the plurality of mass storage devices comprises reassigning ownership of the mass storage devices independently of how the plurality of mass storage devices and the external storage head unit are physically interconnected.

9. A method as recited in claim 7, wherein using a command to reassign ownership of the plurality of mass storage devices comprises reassigning ownership of the mass storage devices without removing any of the mass storage devices from the chassis.

10. A method as recited in claim 7, wherein using a command to reassign ownership of the plurality of mass storage devices comprises storing an ownership attribute on a storage medium in each of the plurality of mass storage devices.

11. A method as recited in claim 7, further comprising connecting the external storage server head unit to a second plurality of mass storage devices installed in a second chassis, wherein the external storage server head unit further has ownership of the second plurality of mass storage devices.

12. A method as recited in claim 7, wherein the storage server head installed within the chassis is implemented on a single circuit board.

13. A method as recited in claim 7, further comprising, after removing the storage server head from the chassis, installing an input/output module in the chassis substantially in a space previously occupied by the storage server head.

14. A method of reconfiguring a storage system, the method comprising:
operating an integrated storage system which includes a plurality of mass storage devices installed in a chassis and a plurality of storage server heads installed in the chassis to control the mass storage devices in response to a set of clients, wherein each of the plurality of heads has ownership of a different subset of the plurality of mass storage devices, and each of the mass storage devices is owned by exactly one

of the storage server heads, wherein each of the storage server heads is implemented on a separate, single circuit board;

disconnecting each of the storage server heads from the mass storage devices;

removing each of the separate, single circuit boards from the chassis;

installing a plurality of input/output modules in the chassis substantially in a space previously occupied by the separate, single circuit boards;

connecting a plurality of external storage server head units to the mass storage devices installed in the chassis via the input/output modules; and

using a software-based command to reassign ownership of the plurality of mass storage devices to the plurality of external storage server head units independently of how the mass storage devices and the external storage server head units are physically interconnected, without removing any of the mass storage devices from the chassis.

15. A method as recited in claim 14, wherein using a software-based command to reassign ownership of the plurality of mass storage devices comprises storing an ownership attribute on a storage medium in each of the plurality of mass storage devices.

16. A method as recited in claim 14, further comprising connecting the external storage server head units to a second plurality of mass storage devices installed in a second chassis, wherein one of the external storage server head units further has ownership of the second plurality of mass storage devices.